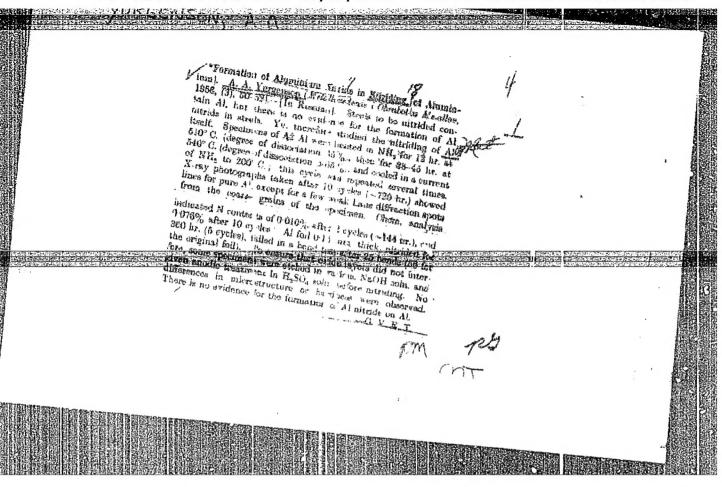
The authors report the following results: Preliminary heat treatment influences the brittleness of a nitrided layer to a considerable degree; in the nature of a preliminary heat treatment of the 36khm/Ma steel, quenching at 930°C in water was recommended as this guarantees higher mechanical properties than quenching in oil and less brittleness of the nitrided layer, and, in addition, the saving of considerable quantities of oil. The sharp decline of the brittleness of the nitrided layer of the sample quenched at temperatures over 1,000°C was explained by the growth of the grain of steel and by the formation of a nitride network. (Metallovedeniye i Obrnbotka Mettalov, No 4, Apr 57, pp 41-44) (U)



AUTHOR:

Yurgenson, A.A., Engineer, and Pogrebetskaya, T.M., Engineer. 129-4-8/17

TITIE:

On reducing the brittleness of the nitrided layer of the steel 38XM/0A. (O ponizhenii khrupkosti azotirovannogo sloya stali 38KhMYuA)

PERIODICAL:

"Metallovedenie 1 Obrabotka Metallov" (Metallurgy and Metal Treatment) 1957, No. 4, pp. 41 - 44 (U.S.S.R.)

ABSTRACT:

The preliminary heat treatment influences to a considerable extent the brittle strength of nitrided steel. On the basis of experiments, which are described in some detail, the authors recommend hardening from 930°C in water since they found that such treatment ensures better mechanical properties than hardening in oil, the brittleness of the nitrided layer is reduced and considerable savings are made in the quantity of required oil. A sharp decrease of the brittle strength of nitrided layers of specimens hardened from temperatures about 1 000°C is attributed to growth of the steel grain and formation of a nitride lattice. The investigations related to cylinder liners, the material of which contained 0.39% C, 1.45% Cr, 0.60% Al and 0.14% Mo. 25 x 30 mm specimens

Card 1/2

On reducing the brittleness of the nitrided layer of the steel 38XMMA. (Cont.) 129-4-8/17

cut out from annealed tubes were hardened from 850, 900, 1 000 and 1 050 °C in water and tempered at 640 °C. The holding time during hardening was 1.5 hours, during tempering 3 hours.

There are five figures including two graphs, and three Slavic references.

ASSOCIATION: Sverdlov Turbine Works. (Sverdlovskiy Turbomotornyy Zavod)

AVAIIABLE:

Card 2/2

1. Sverblousky Lunhamolomyy Zanod. (case hardening) (Steel - Brittleness)

YURGENSON, A.A.

129-10-8/12

Vyshkovskiy, Yu.G. and Yurgenson, A.A., Engineers.

Influence of cold treatment on certain mechanical proper-AUTHOR: ties of high alloy, case-hardened steels. (Vliyaniye TITLE: obrabotki kholodom na nekotoryve mekhanicheskiye svoystva

vysokolegirovannykh tsementovannykh staley)

"Metallovedenive i Obrabotka Metallov" (Metallurgy and Metal Treatment), 1957, No.10, pp. 33-35 (U.S.S.R.) PERIODICAL:

Introduction into industry of cold treatment for eliminating the residual austenite in the cemented layer of the high ABSTRACT: alloy steels IBXHBA, 18XHMA and 12X2H4A involves considerable difficulties, as was mentioned in several published papers (2) to (5). Some authors pointed out that cold treatment affects adversely the mechanical properties of cemented specimens, i.e. not only the ductility but also the strength values and Sadovskiy, V.D. et alii (7) attributed this adverse values to the formation of micro-cracks and Sokolov, K.N. (9) recommends using cold treatment only for components which are not very highly stressed. The authors of this paper consider it of interest to compare the influence of cold treatment on the mechanical properties of the specimens for various distributions of the residual austenite in the cemented layer. For this purpose, they subjected 30 ground specimens, 10x10x120 mm

Card 1/3

129-10-8/12 Influence of cold treatment on certain mechanical properties of high alloy, case-hardened steels. (Cont.)

of the steel 18XHBA to cementation at 890 C for 9 hours, using a solid carburisation agent, whereby a cementation depth of 0.80 mm was obtained. After the cementation process, one batch of the specimens was cooled in oil, whilst the other was cooled in air inside the case-hardening box. After cementation, all the specimens were cooled to -78 C and held at that temperature for 3 hours and, following that, they were tempered at 150 C for 2 hours. Some of the specimens were then tested directly for static bending whilst others were tested for static bending after grinding off 0.05 and 0.10 mm at 2 opposite edges; the latter case, the ground edges were perpendicular to the direction of the bending load. The results are entered in Tables 1 and 2. An increase in the cooling speed after case-hardening, which prevents the formation of troostite skin in that part of the case-hardened layer which contains free carbides, brings about an improvement in the mechanical properties of low temperature treated specimens as compared with those which were cooled slowly and where conditions for formation of a troostite edge are more favourable. Removal of a part of the Card 2/3 case-hardened layer by grinding improves the mechanical

129-10-8/12

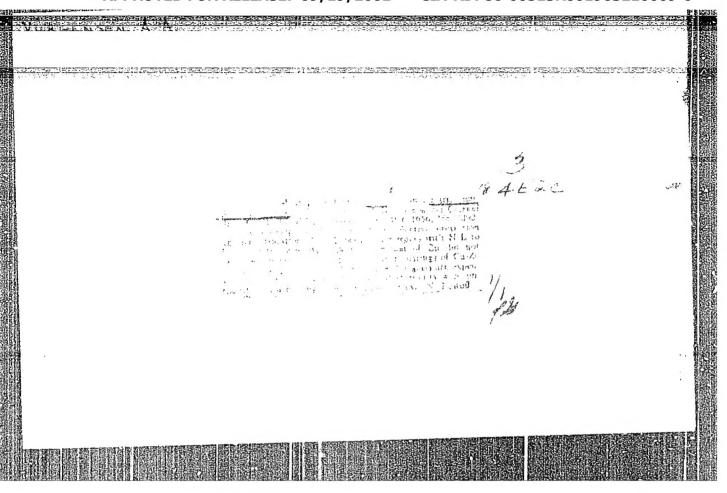
Influence of cold treatment on certain mechanical properties of high alloy, case-hardened steels. (Cont.)

properties of all the specimens and the improvement is more pronounced in the slowly-cooled specimens; after grinding off 0.1 mm, the mechanical properties of both groups of specimens were almost equal.

There are 2 tables, 3 figures and 13 Slavic references.

AVAIIABLE: Library of Congress

card 3/3



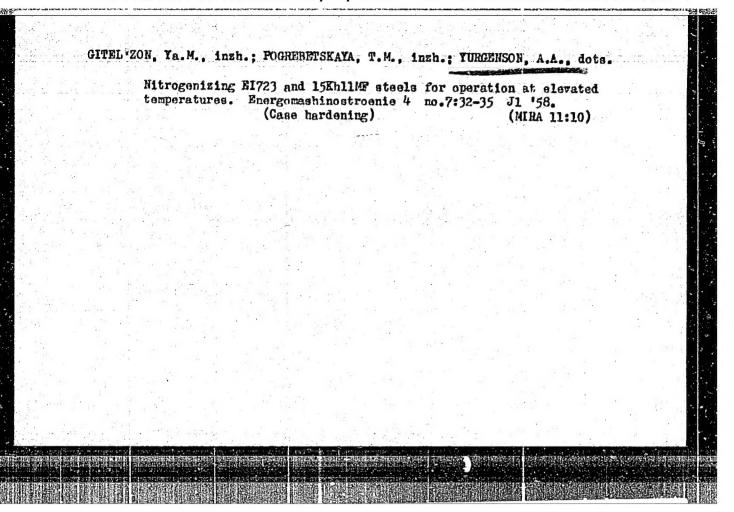
#### "APPROVED FOR RELEASE: 09/19/2001

CIA-RDP86-00513R001963210009-0

BONACHEV, I.N., doktor tekhnicheskikh nauk, professor; GITEL'ZON, Ya.M., inzhener; POORESTSKAYA, T.M., inzhener; TUROKESON, A.A., inzhener.

Investigating the cavitation and erosion resistance of the 38KhMIUA zinc coated and nitrided steel. Vest.mash. 37 no.9:24-26 S '57.

(Steel--Testing)



SOV/137-59-3-7003

Translation from: Referativnyy zhurnal. Metallurgiya, 1959, Nr 3, p 296 (USSR)

AUTHORS: Vyshkovskiy, Yu. G., Yurgenson, A. A.

TITLE: A Novel Technological Process of Heat Treatment of Atomizer Hous-

ings (Novyy tekhnologicheskiy protsess termicheskoy obrabotki kor-

pusov raspyliteley)

PERIODICAL: Tr. Ural'skogo politekhn. in-ta, 1958, Nr 68, pp 132-140

ABSTRAGT: Heat treatment of all atomizer housings made of steel 18KhNVA is carried out in accordance with the following procedures: Pack carburizing at a temperature of 880-900°C until a carburized layer 0.5-0.8 mm deep had been obtained (exposure time 3.5-4 hrs); cooling in air in closed boxes to a temperature of 70° or lower. Components which had successfully passed metallographic inspection are removed and placed into a cooler unit (direct contact with dry ice) for a period of 2 hours; after drying at 100°, they are wiped dry and are then subjected to individual hardness testing (RA=82). This is followed by tempering in an oil bath at a temperature of 220-240° for a period of 5 hours. After tempering, 5-10% of the components are again subjected to hardness testing (RA=79-81), and the entire batch

SOV/137-59-3-7003

A Novel Technological Process of Heat Treatment of Atomizer Housings

is then transferred to the machine shop for final machining. The new heattreatment technology proved to be stable and reliable under shop conditions. The degree of deformation was reduced, better fits between the atomizer housing and the needle valve were attained, and the occurrence of rejects due to jammed needle valves was eliminated.

A. B.

Card 2/2

AUTHOR: Yurgenson, A-A-

TITLE: Role of Hydrogen in Nitriding of Steel (Rol' vodoroda pri azotirovanii stali)

PERIODICAL: Fizika Metallov i Metallovedeniye, 1959, Vol.7, Nr.1, pp 110-115 (USSR)

ABSTRACT: The influence of hydrogen on the nitriding process and the properties of the nitrided layer may be exerted in the following direction: (1) As the quantity of hydrogen in the gaseous phase increases, the latter occupies a larger number of active centres on the nitrided surface, renders absorption of nitrogen more difficult and thereby slows down the nitriding process (Ref.1). (2) An increase in the concentration of hydrogen in the gaseous phase makes the reversible reaction of nitride formation go to the left:

 $nMe + mNH_3 \longrightarrow Me_nN_m + 3mH$ 

Hence, a surplus of atomic hydrogen in the gaseous medium leads to denitriding of the steel by lowering the surface concentration of nitrogen (Ref.2). By removing hydrogen Card 1/6 from the gaseous phase, it is possible to accelerate the

Role of Hydrogen in Nitriding of Steel

nitriding process. By placing FeSi into the nitriding furnace, it is possible to obtain SiH<sub>4</sub>, to attain a decrease in the amount of hydrogen in the gaseous phase and to increase the rate of nitriding (Ref. 3). (3) At the nitriding temperatures, hydrogen is bound to cause decarburisation of the metal surface by forming hydrocarbons and destroying carbides (Ref. 2).

 $\text{Me}_{n}\text{C}_{m}$  +  $\text{pH} \Longrightarrow \text{nMe}$  +  $\text{C}_{m}\text{H}_{p}$ 

This reaction causes an increase in the brittleness and a decrease in the surface hardness of the nitrided layer.

(4) Hydrogen, having a small atomic radius, diffuses
(4) Hydrogen, having a small atomic radius, diffuses
easily into the metal, thereby causing decrease in plastic properties and increase in brittleness of the nitrided properties and the quantity of hydrogen in the gaseous phase ammonia and the quantity of hydrogen in the gaseous phase increases, its action must increase. The impact resistance and hydrogen content after nitriding metals with different and hydrogen content after nitriding metals with different coatings, are shown in Table 1. From this it can be seen

Role of Hydrogen in Nitriding of Steel

that whereas a tin and copper coating fully protects the metal from being saturated with nitrogen, hydrogen diffuses into the steel through any coating, but most readily if the steel is phosphated. An additional tempering at 100-200°C brings about an increase in impact resistance of nitrided specimens, which is due to the influence of hydrogen contained in the nitrided steel. In order to study the decarburising action of hydrogen in nitriding, experiments were carried out in which the change in carbon content in chips was studied during prolonged nitriding. experiments were carried out in which the composition of the carbonitride phases and the distribution of carbon along the depth of the nitrided layer was studied. Chips of various types of steel and cast iron were placed into brass net bags, and nitrided under production conditions together with block cases in PNA-1 furnaces, by: (a) heating to 510 ± 500 and holding at this temperature for 12 hours: the degree of dissociation of ammonia does not exceed 35%; (b) heating to 540 ± 5°C and holding at this temperature Card 3/6 for 38-45 hours: the degree of dissociation of ammonia does

SOV/126-7-1-15/28

Role of Hydrogen in Nitriding of Steel

not exceed 65%; (c) cooling in dissociated ammonia (from the adjoining chamber) to 200°C. Simultaneously, 10 bags containing chips of one type of steel were placed into the furnace. After the nitriding cycle was finished, all bags Some of them were sent for chemical analysis, the rest were nitrided again. In this manner the carbon content in the chips submitted to nitriding for 1 - 10 cycles was determined. The results of this series of experiments are shown in Table 2. From this it can be seen that as the duration of nitriding increases the quantity of carbon in the chips sharply decreases, which is due to the decarburising action of hydrogen. For a further confirmation of these results the following experiments were carried out: - a strip of the steel 65G, 0.15 mm thick, was nitrided for 1 - 8 cycles; half of the specimens were nitrided in the usual manner, and half in bags filled with carbon. Data of carbon content after such treatment are shown in Table 3, from which it follows that nitriding in carbon brings about considerably less decarburisation than by the usual method. For the Card 4/6 separation of carbonitride phases a method was used which

Role of Hydrogen in Nitriding of Steel

was suggested for the determination of the carbide phase in carbon steel (Ref.6). The change in carbon content of the carbide phase can be seen in Table 4. Specimens of steel U8, 18 mm diameter and 22 mm long, were nitrided in the above manner for 1, 2 and 3 cycles, after which their carbon contents were determined. The results are shown in An investigation of the interaction between Figs.1, 2 and 3. hydrogen in the gameous phase and carbon of the steel has shown that in nitriding one of the possible gaseous compounds is prussic acid. From the above experiments the author has arrived at the following conclusions: 1. During nitriding the carbon in the surface of the steel reacts with a gaseous phase, forming gaseous compounds (cyanides and probably carbon compounds). 2. A decrease in carbon content in the surface layer lowers the surface hardness of the nitrided layer, and increases the brittleness. 3. One of the reasons for the displacement of the maximum hardness into the depth of the nitrided layer is the decrease Card 5/6 in carbon content in the surface layer.

Role of Hydrogen in Nitriding of Steel

There are 3 figures, 4 tables and 7 Soviet references.

ASSOCIATION: Ural'skiy turbomotornyy zavod (Ural Turbine Works)

SUBMITTED: April 16, 1957

Card 6/6

87947 5/114/60/000/006/006/008 E193/E383

18-1150

Kostenko, A.V., Pogrebetskaya, T.M., Engineers AUTHORS :

and Yurgenson, A.A., Docent

TITLE:

Study of Nitrided Steels 15XIMQ (15KhllMF) and 15X12BMQ (15Kh12VMF) After Prolonged Holding at 570 C

Energomashimostroyeniye, 1960, No. 6, PERIODICAL: pp. 33 - 36

Owing to the necessity of using nitrided heatresistant steels in turbines operating under conditions of high steam pressures and temperatures, need has arisen to determine the effect of time and temperature on the properties of the nitrided layers; hence the investigation described in the present paper. The composition (in wt.%) of the steels used in the experiments was as follows: steel 15KhllMF - 0.15% C, 0.50% Si, 0.32% Mn, 10.62% Cr, 0.25% Ni, 0.70% Mo, 0.35% V, 0.015% S and 0.02% P; steel 15Kh12VMF - 0.13% C. 0.26% Si, 0.66% Mn, 12.0% Cr, 0.45% Ni, 0.80% W, 0.59% Mo, 0.20% V, 0.012% S and 0.02% P. Card-1/10-

89917 5/114/60/000/006/006/008

Study of Nitrided Steels 15KhllMF and 15Khl2VMF After Prolonged Holding at 570 °C

The experimental test pieces were heat-treated (air-hardening from 1 050 °C plus tempering at 740 °C in the case of steel 15KhllMF and oil-quenching from 1 000 °C plus tempering at 700 °C in the case of steel 15Khl2VMF), machined to 10 x 10 x 30 mm in size, electrolytically degreased, pickled, phosphated and then subjected to the nitriding treatment, which consisted of 20 hours at 530 °C, followed by 20 hours at 580 °C, the degree of dissociation of ammonia being 35% at the lower and 65% at the higher temperature. The Rockwell hardness of the surface of the nitrided specimens was the same for both steels and amounted to 91 HRN; the nitrided layer of steel 15Khl1MF was slightly thicker (0.37 mm) than that of the steel 15Khl2VMF (0.32 mm). The nitrided test pieces were then held at 570 °C for 6 000 hours and during this period the microhardness across the nitrided layer and its thickness were measured at regular intervals, and the Card-2/10

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Study of Nitrided Steels 15Khl1MF and 15Khl2VMF After Prolonged Holding at 570  $^{\circ}\text{C}$ 

microstructure of the nitrided layers was examined. Some of the typical results are reproduced in Fig. 1, where the

hardness (kg/mm<sup>2</sup>) is plotted against the distance (mm) from the surface of the nitrided layer on steels 15KhllMF (graph a) and 15Khl2VMF (graph b); experimental points marked by dots, crosses and circles relate to measurements taken immediately after nitriding, after 3 500 hours at 570 °C, and after 5 000 hours at 570 °C, respectively. Another set of results is given in Table 3:

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Study of Nitrided Steels 15KhllMF and 15Khl2VMF After Prolonged Holding at 570 °C

	Depth (mm) of the nitrided layer (determined by microhardness measurements) on steel	
Time (hrs)	microhardness measurements) on steel	
at: 570 °C		

at 570 °C		
<i>ac y</i> <sub>1</sub> 0 0	15Kh11MF	15Kh12VMF
0 250 1500 3500 5000	0.37 0.50 0.55 0.55 0.60	0.37 0.45 0.50 0.50 0.60

Metallographical examination of the test pieces showed that the nitrided layer consisted of two (main and intermediate) sub-layers, the intermediate sub-layer in steel 15KhllMF being more sharply defined than that in the other steel. The

Card 4/10

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Study of Nitrided Steels 15Khl1MF and 15Khl2VMF After Prolonged Holding at 570 °C

increase in the thickness of the nitrided layer after holding at 570 °C was caused mainly by an increase in the thickness of the intermediate sub-layer, this increase being smaller in steel 15khl2VMF. After holding at 570 °C, a light-grey film was formed on the surface of specimens of both steels. X-ray diffraction analysis showed that the film constituted a scale consisting of Fe<sub>2</sub>O<sub>3</sub>, Fe<sub>3</sub>O<sub>4</sub> and Fe<sub>0</sub>.Cr<sub>2</sub>O<sub>3</sub>. Of the two steels studied, the rate of scale

formation was faster on steel 15KhllMF. After prolonged holding at 570 °C nitrides were precipitated at the grain boundaries and the upper, nitrogen-rich part of the nitrided layer; at a later stage, these nitride precipitates became surrounded by an oxide layer. This effect is illustrated in Fig. 4, showing microphotographs (X340) of the nitrided layer in steel 15KhllMF after: a) 250; b) 3 000 and c) 4 000 hours at 570 °C. According to the

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## 87947 \$/114/60/000/006/006/008 £193/£383

Study of Nitrided Steels 15KhllMF and 15Khl2VMF After Prolonged Holding at 570 °C

present authors, the preferential oxidation of the nitrided layers along the grain boundaries is associated with the precipitation of nitrides which form a nitride-metal cell, thus creating conditions favourable for oxidation. Analysis of the results obtained led the present authors to the following conclusions.

1) A mitrided layer, formed on the more heat-resistant steel 15Kh12VMF, is more stable at higher temperatures than that formed on steel 15Kh11MF. The former steel can be recommended as the material for nitrided components operating at 570 °C.

2) In order to increase the resistance of nitrided layers against oxidation during service as elevated temperatures, the nitriding process should be carried out in such a manner as to prevent the formation of a nitride network.

Card 6/10

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Study of Nitrided Steels 15KhllMF and 15Khl2VMF After Prolonged Holding at 570 °C

3) The result of work conducted at the Turbomotornyy zavod (Turbomotor Plant) has shown that the optimum properties of the nitrided layer (thickness of the layer 0.2 - 0.4 mm, hardness not less than 89 HRN) formed on high chromium-content steels are obtained if the nitriding process consists of 12 hours at 530 °C, followed by 18 hours at 580 °C, the degree of dissociation of ammonia being 35% at the lower and 65% at the higher temperature. There are 6 figures, 3 tables and 5 Soviet references.

Card-7/10

YUKGENSON, A.A

81824

8/129/60/000/07/010/013 E193/E235

18.1130 18.95.20

V. Lopukhina, Ye. V., Pogrebetskaya, T. M., A., Engineers Kostenko. and Yurgenson, A.

After Prolonged

AUTHORS:

Structure of Nitrided Steel 15KhllMF Service at Elevated Temperatures

TITIE: PERIODICAL: Metallovedeniye i termicheskaya obrabotka metallov,

TEXT: Following their earlier findings (Ref. 1 to 3) that hardness of nitrided stainless and austenitic steels decreased after prolonged service at high temperatures the process of the stainless and austenitic steels decreased after prolonged service at high temperatures. service at high temperatures, the present authors carried out a systematic study of this effect on nitrided specimens of steel systematic study of this effect on hitrided specimens of steel 15khllMF which is frequently used as the material of some parts of steam turbines, operating at approximately 570°C. The test pieces, steam turbines, operating at approximately 570°C, were electrolytically normalised at 1050°C and tempered at 740°C, were electrolytically normalised at 1050°C and tempered at 740°C, were electrolytically degreased, pickled, phosphated and then nitrided by a two-stage process (20 h at 550°C followed by 20 h at 500°C, the degree of dissociation of ammonia being 35 and 65% respectively) which produced a nitrided layer 0.37 mm thick, with hardness HRN equal 95. The structure of the nitrided layer and the effect of prolonged Card 1/3

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Structure of Nitrided Steel 15KhllMF After Prolonged Service at Elevated Temperatures

(up to 5000 h) treatment at 570°C in air, was studied by X-ray analysis, metal lographic examination, and microhardness measurements. It was established that, starting from its surface, the following strata can be distinguished in the surface layer of a nitrided steel: (1) Fe<sub>2</sub>N + Fe<sub>4</sub>N + CrN; (2) Fe<sub>4</sub>N + α + CrN; (3) α + CrN; (4) α + carbides. On heating in air, an oxide scale is formed whose thickness, after 5000 h at 570°C, reaches 0.09 nm, and the surface layer of the nitrided steel after such treatment contains the following strata: (a) Fe<sub>2</sub>O<sub>3</sub> (microhardness - 763 kg/mm<sup>2</sup>); (b) Fe<sub>3</sub>O<sub>4</sub> (microhardness - 455 kg/mm<sup>2</sup>); (c) Fe<sub>0</sub>Cr<sub>2</sub>O<sub>3</sub>; (e) α + Cr<sub>2</sub>N; ness - 455 kg/mm<sup>2</sup>); (d) α + CrN + Fe<sub>0</sub>Cr<sub>2</sub>O<sub>3</sub>; (e) α + Cr<sub>2</sub>N; (f) α + carbides. The most intensive oxidation takes place in the region which originally consisted of iron nitrides. This is attributed by the present authors to the fact that nitrides form solid solutions which are homogeneous within a wide composition limit and which are characterised by a high concentration of vacant lattice

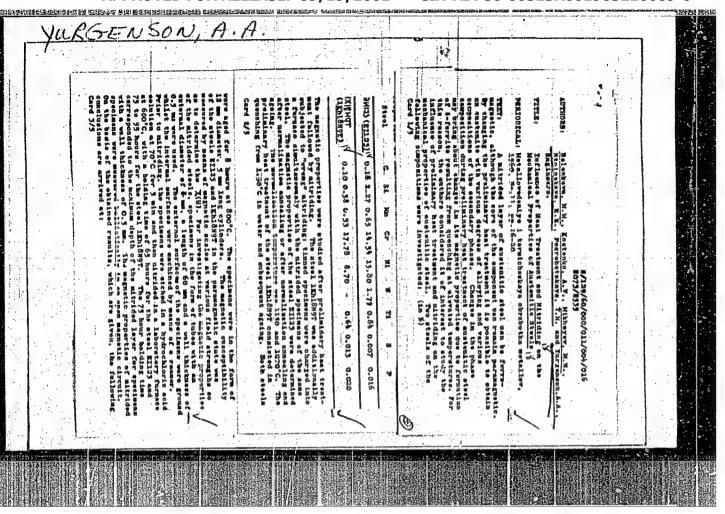
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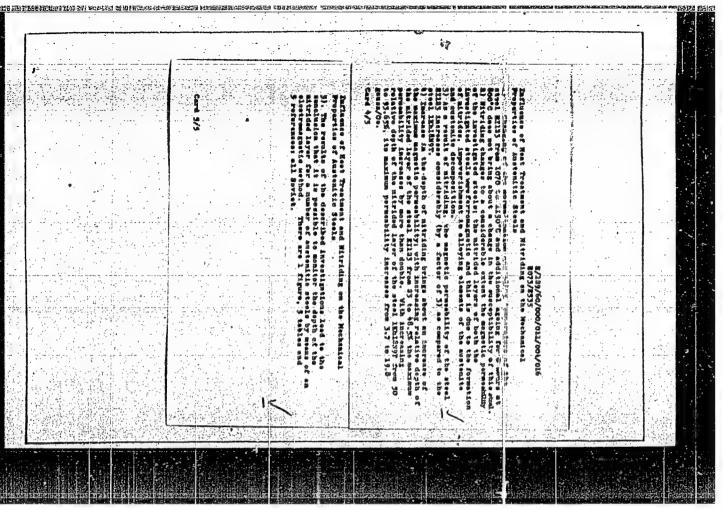
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Structure of Nitrided Steel 15KhllMF after Prolonged Service at Elevated Temperatures

sites, facilitating diffusion of oxygen. Since hardness of the nitrided layer would be only slightly decreased by removing its outermost part (to a depth of say 0.1 mm), consisting mainly of iron nitrides, such a treatment should increase the resistance of nitrided steel to scale formation on prolonged heating and so prevent the decrease in hardness, usually taking place under these conditions. There are 3 figures, 2 tables and 7 Soviet references.

Card 3/3





APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963210009-0"

80885 8/126/60/009/06/040/025

18.7400

Kostenko, A.V., Lopukhina, Yo.V., Pogretetskaya, T.M.

AUTHORS: Kostenko, A.V., Lor and Yurgenson, A.A.

TITLE: Pecularities in the Behaviour of Nitrided Type 1Kh18N9T

Steel During Prolonged Residence at a High Temperature

PERIODICAL: Fizika metallov i metallovedeniye, 1960, Vol 9, Nr 6,

pp 868 - 877 (USSR)

ABSTRACT: The authors point out that the nitriding of austenitic steels has not been used in gas-turbine construction

(Ref 2) because of process and finishing difficulties and the insufficient high-temperature stability of the nitrided layer (Refs 3,4). A previous study by the authors

of a group of nitrided steels (Ref 5) showed the superiority of type 1Kh18N9T steel in these respects and the present investigation aimed at a more detailed study. Specimens of the steel (0.10% C, 17.80% Cr, 9.7% Ni, 0.64% Ti,

0.012% S, 0.020% P, 0.53% Mn, 0.58% Si) were hardened from 1 150 °C, aged for 8 hours at 800 °C, pickled in hydrochloric acid and nitrided at 600 °C for 75 hours.

A 0.29 mm deep nitrided layer with a hardness  $H_R = 92$ 

Card1/4

was obtained. The kinetics of reaction-diffusion of

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Peculiarities in the Behaviour of Nitrided Type 1Kh18N9T Steel During Prolonged Residence at a High Temperature

nitrogen and changes in the nitrided layer during prolonged holding at 680°C in furnaces of a type IP-2 machine (as described in Ref 6) were investigated. For studying phases at increasing depth below the surface of the nitrided and scale-layer X-ray structural analyses of successive layers were carried out at the Ural'skiy gosuniversitet (Ural State University) in consultation with V.N. Konev. Figure 1 shows the structure of the nitrided layer before and after holding for 3 000 hours at 680°C, while the oxides on an etched polished section after 250 hours is shown in Figure 2. The linear relations

between the square of the gain in weight (g/mm<sup>2</sup>) (Curve 1) and the square of the depth (mm) of the nitrided layer on the one hand and the duration of nitriding (hours) on the other given in Figure 3 indicates a parabolic law for nitrogen diffusion. The X-ray patterns from succesive layers before and after holding at 680 °C for 4 500 hours are shown in Figures 4 and 5, respectively, the nature of

Card2/4

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Peculiarities in the Behaviour of Nitrided Type 1Kh 8NgT Steel During Prolonged Residence at a High Temperature the phases being listed in Tables 1 and 2, respectively.

The surface hardness of the nitrided steel is plotted against duration of holding (hours) at 680 °C in Figure 6, the corresponding effect on the depth of the nitrided layer being shown in Figure 7 (Curves 1, 2 and 3 refer to the whole, base, and transition layers, respectively). Figure 8 shows hardness as a function of depth below surface before and after holding for 5 000 hours (Curves 1 and 2, respectively). The work showed that saturation of the steel with nitrogen leads to austenite decomposition; the nitrogen is fixed as a nitride with the CrN structure. Prolonged holding at 680 °C gave an outer scale layer of ferric oxids and an inner layer of (Cr.Fe) 203;

nitrides dissociate; inside the nitrided layer complete austenite decomposition occurs, with equalization of nitrogen concentration with depth and formation and congulation of nitrides. The authors recommend that nitriding conditions should be selected to give the greatest quality of stable nitrides (not iron nitrides) mechanically

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Peculiarities in the Behaviour of Nitrided Type 1Kh18N9T Steel During Prolonged Residence at a High Temperature

hindering nitrogen diffusion and to prevent formation of much alpha-phase. There are 8 figures, 2 tables and 14 references, 12 of which are Soviet, 1 English and 1 German.

ASSOCIATION: Sverdlovskiy turbomotornyy zavod (Sverdlovsk Gasturbine Works)

SUBMITTED: January 7, 1960

Card 4/4

V

S/129/61/000/012/002/005 E193/E383

1.1800

Engineer

AUTHOR: Selections of nitriding schedules and depth of the

TITLE: nitrided layer

Metallovedeniye i termicheskaya obrabotka metallov, PERIODICAL: no. 12, 1961, 13 - 16

Side effects of nitriding are discussed in relation to the mechanical properties and corrosion-resistance of nitrided steels. It is pointed out that one of the consequences of the formation of nitrides is the formation of interphase boundaries with a heavily-distorted crystal lattice and refingment of the mosaic structure. Thus, in steel nitrided at 520

measuring  $5 \times 10^{-5}$  cm appear, as a result of which the surface area of the sub-boundaries with distorted crystal lattice increases and internal stresses of the second type and distortions of the third type appear in the metal. Internal stresses of the first type are set up as a result of different thermalexpansion coefficients of the matrix and nitrides. At the same

Card 1/7

S/129/61/000/012/002/005 E193/E383

Selections of nitriding ...

time, the solid solution is denuded of the alloying elements; as a result, the stability of the solid solution in austenitic steels is decreased and the corrosion-resistance of stainless, acid- and oxidation-resistant steels is reduced. X-ray-diffraction studies of the distribution of stresses of the first type has shown that the maximum compressive stresses are situated at a certain distance from the surface. The magnitude of the compressive stresses decreases with increasing content of the \(\varepsilon\)-phase in the nitrided layer; when the \(\varepsilon\)-phase content exceeds 50% tensile

stresses of up to 20 kg/mm<sup>2</sup> are set up in the surface layer (Ref. 2 - Fuks, M.Ya. and Tkach, A.Ya., Trudy KhPI im. V.I. Lenina. Seriya inzhenerno-fizicheskaya, v. 14, 1958). To attain maximum endurance limit, the formation of a surface nitride film or a nitride network must be avoided and the depth of the nitrided layer,  $\Delta$ , must meet the condition  $\Delta/r = 0.1 - 0.2$ , where r is the distance between the neutral axis of the material and the most heavily-stressed fibre. In the case of localized nitriding, tensile stresses which decrease the

Card 2/7

S/129/61/000/012/002/005 E193/E383

Selections of nitriding ....

resistance of the metal to cyclic loading are set up in the surface layer at a certain distance from the boundary between nitrided and untreated parts; this boundary, therefore, should not be placed in a region which carries service loads. Nitrides of Fe, Mo and probably Mn readily oxidize in air; if nitriding conditions are such that the steel is supersaturated with nitrogen, oxides instead of nitrides may be formed with a corresponding change in the properties of the nitrided layer. An oxide scale is readily formed on nitrided steel at 550 -680 °C in the presence of a nitride network (Ref. 8 A.V. Kostenko, Ye.V. Lopukhina, T.M. Pogrebetskaya and A.A. Yurgenson - FMM, v. 11, no. 6, 1960). A 17-fold increase in the resistance of step1 38XMHOA (38KhMYuA) to cavitationerosion is attained by nitriding. It has been shown, however (Ref. 10 - V.V. Gavratsek, D.N. Bol'shutkin - Trudy KhPI im. V.I. Lenina. v. IX, no. 1, 1957), that the erosion stability of the &- and Y'-phasen is 14 times lower than that of the α-phase. Consequently, #f the maximum resistance-to-cavitationerosion is to be imparted to a pearlitic steel, the formation

Card 3/7

# 5/129/61/000/012/002/005 E193/E383

Selections of nitriding

of a surface layer with a minimum content of the e- and Y'phases should be aimed a; in nitriding. Maximum hardness of the nitrided layer is attained at a certain distance from the surface, this distance increasing with increasing depth of nitriding. When the object of nitriding is to improve the corrosion-resistance of steel, a continuous surface film of the ε-phase should be formed. The quantity of the ε-phase can be increased by raising the nitriding temperature to 700 °C. All the alloying additions except Al decrease the depth at which nitrogen-rich phases are formed. The quantity of the s-phase formed depends also on the relative rates of adsorption and diffusion of nitrogen. If adsorption rate is higher than rate of diffusion, the surface becomes saturated with nitrogen and a nitride skin or network is formed. The rate of nitriding can be increased by raising the temperature which, however, brings about a decrease in the surface hardness. For this reason, a two-stage process provides the most convenient means of forming a nitride layer more than 0.25 - 0.30 mm thick in a relatively short time. Nitriding is carried out in the first stage

Card 4/7

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Selections of nitriding

at 500  $\pm$  10 °C for 10 - 15 hours to produce a hard case. The temperature is then raised to 540 - 580 °C for a short time, whereby the rate of diffusion of nitrogen is increased without significantly affecting the hardness of the surface layer. The properties of the nitrided case can be affected by the composition of the nitriding medium. Hydrogen formed as a result of dissociation of ammonia retards the diffusion of nitrogen, decarburizes the steel and decreases its plasticity. According to A.V. Smirnov and L.V. Beloruchev Ref. 13- Controlled atmospheres and their use in thermal and chemicothermal treatment of metals, LDNTP, 1960), improved results are obtained if a mixture of ammonia with an inert gas (molecular nitrogen or hydrogen) is used instead of pure ammonia. Tombry. T (Ref. 14 - "Kohászati lapok", v. 2, no. 5, 1956) has shown that the rate of nitriding can be increased by using pure (99%) nitrogen instead of ammonia. Similarly, a harder case on a mangamese-cast iron was obtained in a 65% nitrogen - 35% ammonia mixture than that formed in pure ammonia (Ref. 15 -Yu.G. Bobro, V.S. Kovalenko - Trudy KhPI im. V.I. Lenina, v. 9, no. 1, 1957). In general, a minimum thickness of the Card 5/7

 Selections of nitriding

S/129/61/000/012/002/005 E193/E383

nitrided case should be aimed at, whereby the productivity of the nitriding equipment is increased and the risk of warping and distortion of the nitrided particles is minimized. Some consideration should be given to the geometry of a nitrided layer. The risk of distortion is less when the entire surface is nitrided but, in this case, the dimensional changes of the article are greater. When only a part of the surface is nitrided, the nitrided case should be symmetrical since, otherwise, distortion of the article will take place. In the case of stainless, acid- and oxidation-resistant steels, those parts of an article should only be nitrided which carry alternating service loads. With the exception of applications in which nitriding is used to increase the corrosion-resistance of steel, the optimum nitriding conditions are those which ensure conversion of all the alloying elements to nitrides and the formation of a minimum quantity of iron nitrides. Abstracter's note: this is an abridged translation.

Card 6/7

Selections of nitriding ... E193/E383

There are 1 figure and 15 references: 13 Soviet-bloc and 2 non-Soviet-bloc.

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#### PHASE I BOOK EXPLOITATION



# Yurgenson, Aleksey Alekseyevich

SOV/6108

Azotirovaniye v energomashinostroyenii (Nitriding In Fower-Plant Machine Building). Sverdlovsk, Mashgiz, 1962. 128 p. 2800 copies printed.

Reviewer: Yu. M. Lakhtin, Professor, Doctor of Technical Sciences; Tech. Ed.: N. A. Dugina; Executive Ed. Of Ural-Siberian Department (Mashgiz): A. V. Kaletina, Engineer.

PURPOSE: This book is intended for process engineers and mechanical engineer-designers. It may also be useful to workers of scientific research institutes and laboratories.

COVERAGE: The book describes the nitriding methods and conditions which will improve the quality of the nitrided case, and is based on results of practices and investigations of plants which have been using the nitriding of important machine parts over long periods of time. Possibilities of applying the nitriding process, to heat-application-resistant steels and other

Card 1/6

# Nitriding In Power-Plant (Cont.)

SQV/6108

special types of steel are discussed, along with methods for the acceleration of the nitriding process. Nitriding of parts widely used in power-rlant machine building is discussed at length in the last chapter. The book is mostly based on work and investigations carried out at the Ural Turbomotor Plant, under the supervision of the author, by Engineers T. M. Pogrebetskaya, A. V. Kostenko, Ye. V. Lopukhina, K. F. Korobka, L. I. Norova, G. V. Chentsova, and N. P. Kuznetsova, and by students L. V. Kudryavsteva, M. I. Nekrasova, V. V. Korovina, J. Ya. Chernikhova, Wang Ke-tsan, V. N. Zelenskiy, Sh. H. Verkhoglazov, and V. V. Rysenberg. There are 252 references, mostly Soviet.

TABLE OF CONTENTS:

Foreword

3

Card 2/6

ZELENSKAYA, G.I., inzh.; NOROVA, L.I.; YERGENSON, A.A.

Materials and the heat treatment of crankshifts for high-speed dissels. Metallowed.i termsobr.met. no.4:56-58 Ap '62.

(Granks and crankshafts) (Steel-Heat treatment)

(MIRA 15:4)

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963210009-0"

S/117/62/000/008/005/005 1007/1207

AUTHORS:

Mikhalitsina, Ye.S., Revzina, V.G., and Yurgenson, A.A.

TITLE:

Phosphate coating of austenitic steel

PERIODICAL: Machinestroitel', no.8, 1962, 35

TEXT: Results are reported of experimental investigations on the phosphate coating of austendic steels, in order to improve working conditions, reduce gripping (seizing) and wear, and increase the service life of phosphate-coated tools. Special indications on the phosphate-coating technology, and test results are presented. It was found that austendic steels may be successfully phosphate-coated by applying special preparatory methods (electrolytic degreasing, pickling) and by utilising special electrolytes in electrical solutions. There is I table.

Card 1/1

# S/126/62/013/004/019/022 E073/E135

AUTHORS:

Belenkova, M.M., Mikheyev, M.N.,

Pogrebetskaya, T.M., and Yurgenson, A.A.

Magnetic properties of the steel 1 X 18 H 9 (1Kh18N9) TITLE:

after heat-treatment and nitriding

PERIODICAL: Fizika metallov i metallovedeniye, v.13, no.4, 1962,

622-625

The authors and their team found earlier that the greater the content of elements forming stable nitrides, the more will the austenite become impoverished of alloying elements during nitriding and the more intensive will be its decomposition and the rejection of the  $\alpha$ -phase. The influence of nitriding on the magnetic properties of steel similar to the previously tested 1 X 18 H 9 T (1Kh18N9T) steel but not containing titanium was studied to verify this conclusion. The compositions of the two 1Kh18N9: 0.14% C; 0,66% 51; 0.85% Mn; 17.68% Cr; 9.02% Ni steels studied were: 0.07% Ti; 0.016% S; 0.016% P.

Card 1/4

S/126/62/013/004/019/022
Magnetic properties of the steel... E073/E135

1Kh18N9T: 0.1% C; 0.58% Si; 0.53% Mn; 17.78% Cr; 8.70% Ni;

0.64% Ti; 0.013% S; 0.02% P. The magnetic properties were determined after heat-treatment (quenching from 1150 °C in water, followed by ageing for 8 hours at 800 °C). Both steels were paramagnetic in the quenched state and their susceptibility values were nearly the same. After ageing the susceptibility increased somewhat, the permeability of both steels after quenching and ageing approached unity and did not depend on the field strength. In the nitrided state the maximum permeability of the steel without Ti was considerably lower than in the steel with Ti. For a relative depth of the nitrided layer of 57.4% the steel 1Kh18N9 had a maximum permeability of 1.8 gauss/Oe, whilst for the steel 1Kh18N9T the maximum permeability was 3.7 gauss/0e for a relative depth of the nitrided layer of 50%. The structures of the nitrided layers of both steels were identical, consisting of austenite and carbide grains in the heat-treated state; the structure of the nitrided layer was reminiscent of sorbite, due to the partial decomposition of the a-phase and the carbides during Card 2/4

Magnetic properties of the steel. S/126/62/013/004/019/022 E073/E135

nitride-formation. The following conclusions are arrived at: Nitriding changes considerably the magnetic properties of steels 1Kh18N9 and 1Kh18N9T; the ferromagnetic nature of the nitrided layer is due to the formation of the  $\alpha$ -phase during nitriding. The steel 1Kh18N9T has a higher permeability in the nitrided state than the steel 1Kh18N9, and the difference is attributed to the presence of Ti in the former, which forms stable nitrides and impoverishes considerably the  $\gamma$ -phase of Ti, reducing its stability and bringing about rejection of  $\alpha$ -phase. The stability of the austenitic structure after nitriding was determined by the concentration of admixtures required for forming uniform austenite and by the ability of the components entering into the austenite to form stable nitrides. The nitrided skin of austenitic steel components should have low permeability values. There are 4 tables.

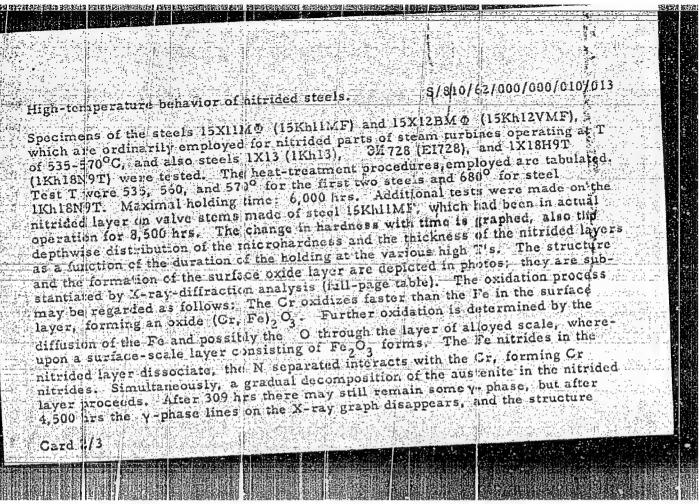
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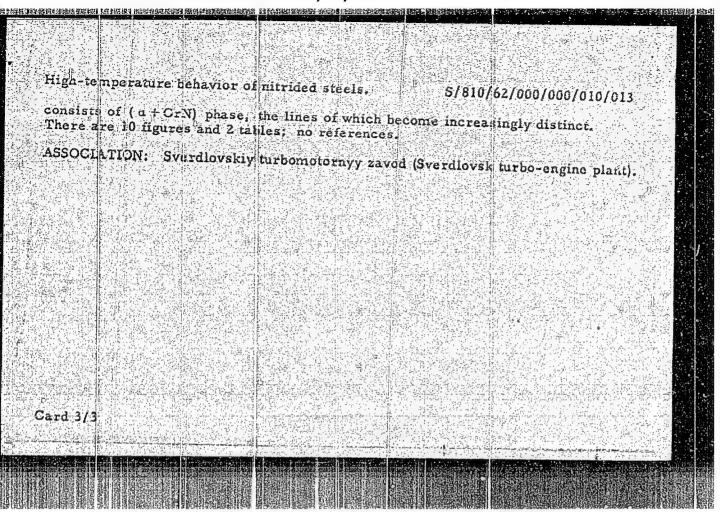
Magnetic properties of the steel.. 5/126/62/013/004/019/022
E073/E135

ASSOCIATION: Institut fiziki metallov AN SSSR
(Institute of Physics of Metals, AS USSR)
Ural'skiy turbomotornyy zavod
(Ural Turboengines Works)

SUBMITTED: August 26, 1961

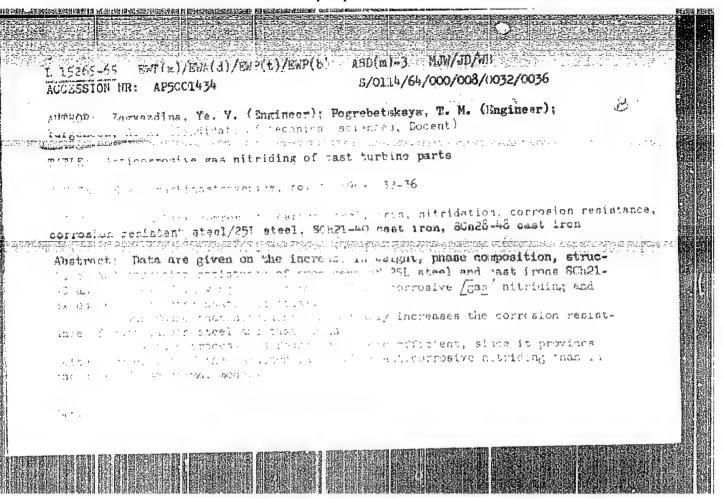
\$/810/62/000/000/010/013 AUTHORS: Pogrebetskaya, T.M., Yurgenson, A.A., Kostenko, A.V. TITLE High-temperature behavior of nitrided steels. SOURCE: Metallovedeniye i termicheskaya obrabotka; materialy konferentșii po metallovedeniyu i termicheskoy obrabotke, sost. v g. Odesse v 1960 g. Moscow, Metallungizdat, 1962, 245-257. TEXT: The paper describes an experimental investigation showing that longterm exposure to high temperatures (T) of nitrided steels leads to the following phenomena: (I) Congulation of the nitrides and dissociation of the less stable Te nitrides, with attendant reduction in hardness; (2) diffusion in depth of the N freed as a result of the natrice dissectation and, therefore, a thickening of the nitrided layer affected; (3) interaction with O; which evokes the formation of a surficial oxide layer. The nitride-dissociation T determines the T limits for the use of nitrided steels. Steels containing greater amounts of elements that form stable and finely-dispersed nitrides conserve their hardness and the thickness of the ni rided layer more effectively. Nitrided steels intended for long-term operation at elevated T must retain a sufficiently great surface hardness, be free of nitride networks and, for austenitic steels, have a minimal quantity of a -phase.





YURGENSON, A.A.; ZELENSKATA, G.I.; ASSONOV, A.D., doktor tekhn.

[Metals for high-speed diesel engines and their heat treatment; a manual] Metally bystrokhodnykh dizelei i ikh termi Meskaia obrabotka; spravochnoe posobie. Moskva, Izd-vo "Mashinostroenie," 1964. 266 p. (MIRA 17:7)



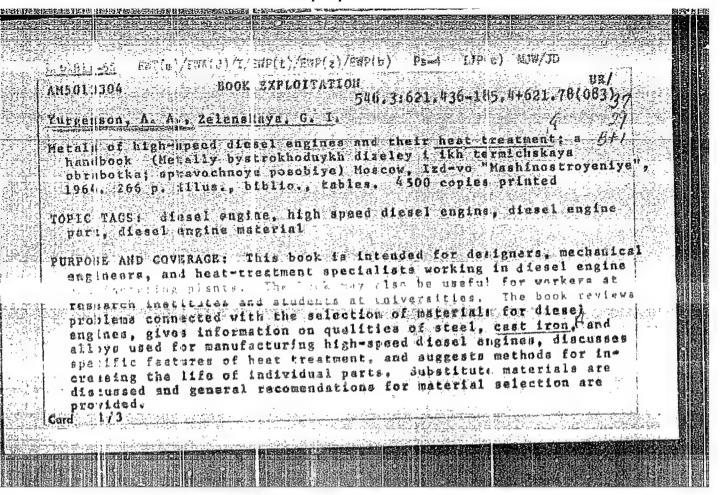
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ZAGVAZDINA, Ye.V.; YURRENSON, A.A.

Investigating the slow nitriding of carbon steel. Fiz. met. i metalloved. 18 no.3139-362 8 '64. (MURA 17:11)

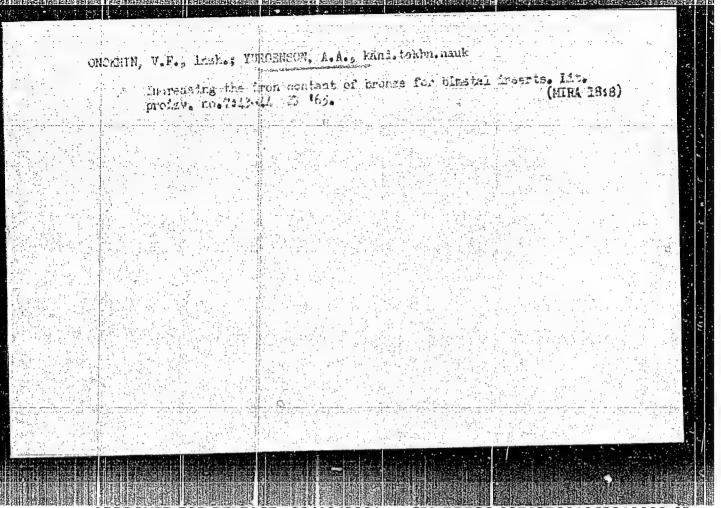
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#12 E	Introduction 3
	Accepted designations 4
į	I. Sine problems concerning the strength and wear resistance -
1	II. Etsels for high stressed parts in diesel engines 19
	Ill. Material for cylinder sleeves 49
	tv. theels for gear wheels 66
į	V. Steels for valves 90
	VI. Treels for precision parts 108
	VTI Steels for apring: -= 120
	Card -/-
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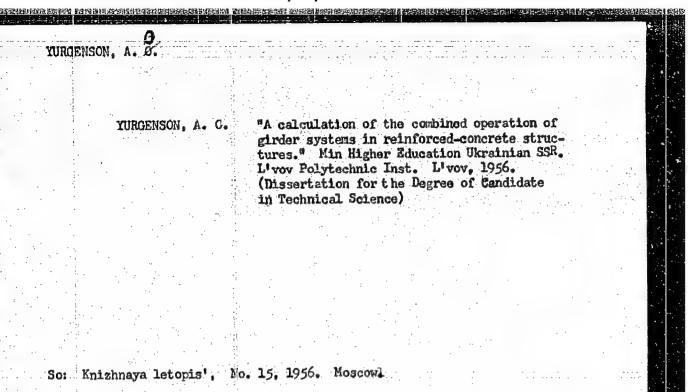
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AUTHORS: Yurgenso	n, A. A.; Zagvazdina, Ye	9. V.	39 B
ORG: Turbine Engi	ne Works (Turbomotornyy z	avod)	
TITLE: Multiple n	itriding of 1Khl3 steel		
SOURCE: Metallove	deniye i termicheskaya ob	orabotka metallov, no. 4, 1966, 75	-78
TOPIC TAGS: chrom phase composition/	ium steel, nitridation, m lKhl3 chronium steel, RK	k ray photography, x ray equipment O x ray equipment	, ammonia,
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ACCESSION NR: AP4046088 5/0126/84/018/003/0359/0362
AUTHOR: Zagyazdina, Ye. V.; Yurgenson, A. A.
TITLE Investigation of protracted nitriding on carbon steel.
SOURCE: Pizika metallov i plotollovodoniya, v. 18, no. 3, 1984, 359-362
TOPIC TAGS: nitriding, oxidation, carbonitride, phase distribution
ABSTRACT: The "U12" steel was subjected to nitriding with a view to determin- ing its phase composition and character. The 15 x 15 x 40 mm specimens ccu- ing its phase composition and character. The 15 x 15 x 40 mm specimens ccu- ing its phase composition and character. The 15 x 15 x 40 mm specimens ccu- ing its phase composition and character. The 15 x 15 x 40 mm specimens ccu- ing its phase composition and character. The 15 x 15 x 40 mm specimens ccu- ing its phase composition and character. The 15 x 15 x 40 mm specimens ccu- ing its phase composition and character. The 15 x 15 x 40 mm specimens ccu- ing its phase composition and character. The 15 x 15 x 40 mm specimens ccu- ing its phase composition and character. The 15 x 15 x 40 mm specimens ccu- ing its phase composition and character. The 15 x 15 x 40 mm specimens ccu- ing its phase composition and character. The 15 x 15 x 40 mm specimens ccu- ing its phase composition and character. The 15 x 15 x 40 mm specimens ccu- ing its phase composition and character. The 15 x 15 x 40 mm specimens ccu- ing its phase composition and character. The 15 x 15 x 40 mm specimens ccu- ing its phase composition and character. The 15 x 15 x 40 mm specimens ccu- ing its phase composition and character. The 15 x 15 x 40 mm specimens ccu- ing its phase composition and character. The 15 x 15 x 40 mm specimens ccu- ing its phase composition and character. The 15 x 15 x 40 mm specimens ccu- ing its phase composition and character. The 15 x 15 x 40 mm specimens ccu- ing its phase composition and character. The 15 x 15 x 40 mm specimens ccu- ing its phase composition and character. The 15 x 15 x 40 mm specimens ccu- ing its phase composition and character. The 15 x 15 x 40 mm specimens ccu- ing its phase composition and character. The 15 x 15 x 40 mm specimens ccu- ing its phase composition and character. The 15 x 15 x 40 mm specimens ccu- ing its phase composition and character. The 15 x 15 x 40 mm specimens ccu- ing its phase composition and character. The 15 x 15 x 40 mm specime
Ni. Two stage nitriding was carried by 12 hrs., ammonia dissociation 12 hrs., ammonia dissociation 35%; (2) 540C for 48 hrs, ammonia dissociation 12 hrs., ammonia dissociation 35%; (2) 540C for 48 hrs, ammonia dissociation
65% At the initial stage carbonitrides were identified in an analysis for a tenfold nitriding the 0.98 mm thick case consisted of CO an 190% NH. After a tenfold nitriding the 0.98 mm thick case consisted of Fe <sub>2</sub> O <sub>3</sub> oxide and Fe <sub>2</sub> N nitrices whereby the iron oxide had an Fe <sub>3</sub> O <sub>4</sub> structure Fe <sub>2</sub> O <sub>3</sub> oxide and Fe <sub>2</sub> N nitrices whereby the iron oxide had an Fe <sub>3</sub> O <sub>4</sub> structure at a depth of 1.2 mm. Chemical analysis showed that by extending the nitriding
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S/050/60/000/010/001/003 B012/B063

AUTHOR:

Yurgenson, A. P.

TITLE:

Investigation of the Structure of Turbulent Motions Causing Bumps to Modern Airplanes

PERIODICAL:

Meteorologiya i gidrologiya, 1960, No. 10, pp. 3 - 8

TEXT: When investigating the structure of atmospheric turbulence causing bumps to airplanes, it is most convenient to employ the methods based on the theory of continuous random processes. These methods were first applied by M. I. Yudin in 1946 (Ref. 2). As the parameters determining the structure of turbulent motions, Yudin used the structure or difference functions of pulsating wind velocities. Formula (2) is written down as the structure function of the pulsation velocity of the wind  $\psi_{\bf k}$ . In the present paper, a

method is given for studying the structure of atmospheric turbulences by determining and analyzing correlations between the structure functions of the (2)-type and the statistical characteristics of bumps to planes. Following ludin the author derives a set of differential equations which

Card 1/3

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Investigation of the Structure of Turbulent Motions Causing Bumps to Modern Airplanes

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express the relationship between the dimensionless random values of pulsation of the various kinematic parameters of the plane  $\xi_i(\tau)$  and the dimensionless functions  $\psi_k(\tau)$  in the form of equation (4).  $\tau$  = time. The author makes use of the general solution obtained in Ref. 2, and obtains formula (6). The latter is integrated, and the structural characteristics of the turbulent flow are thoroughly studied on the basis of criteria depending on the meteorological conditions. Using formula (7) according to the 2/3-law by Kholmogorov-Obukhov, the author obtains formulas (8), (9), and (10). The practical application of these formulas is illustrated by the calculation of characteristics of the pulsation values of the components of flying speed ( $\xi_1$  and  $\xi_2$ ) as dependent on the meteorological parameters  $(A_k, \Delta, \tau_o)$  determining the respective turbulent medium.  $A_k$  is a coefficient, and  $\Delta = \tau_2 - \tau_1$ . The curves shown in Fig. 2 were obtained in the course of computations made on the electronit computer "Ural". These curves illustrate the dependence of fluctuations of the horizontal (Fig. 2a) and vertical (Fig. 2b) components of flying speed on the intensity of action of horizontal and vertical turbulent flows. On the basis of the rules resulting from Card 2/3

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Investigation of the Structure of Turbulent Motions Causing Bumps to Modern Airplanes

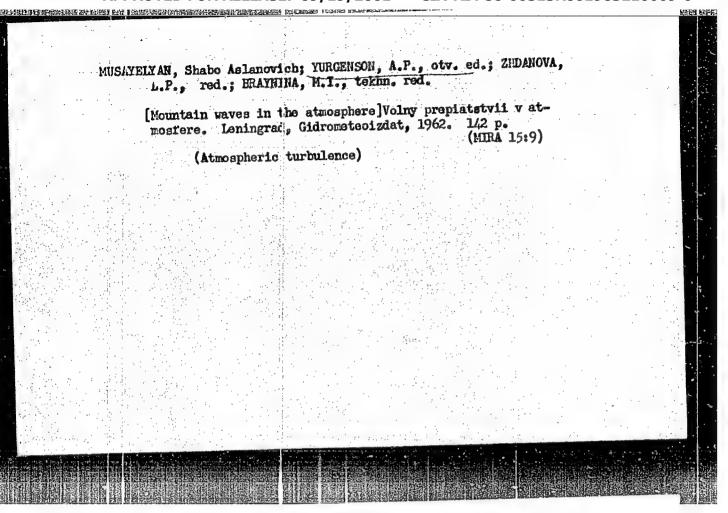
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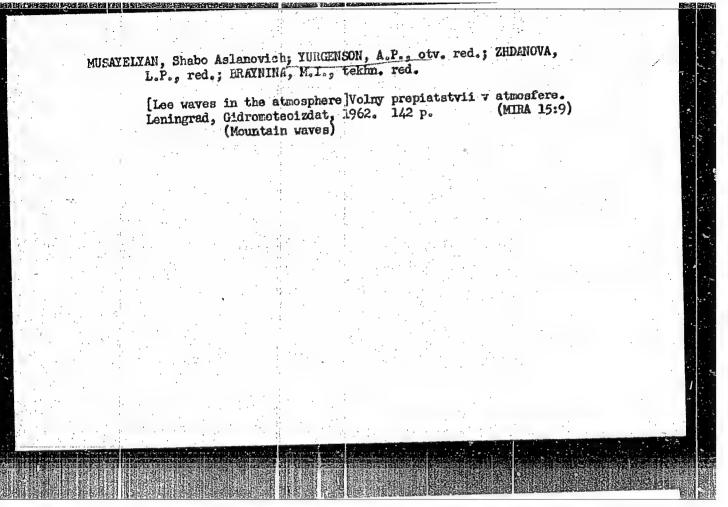
these curves, the author reaches the following conclusions: 1) The highest probability that a modern superfast airplane with a speed of 0.5<M<1.2 enters the zone of bumpiness under otherwise equal conditions occurs in flights at medium and very high velocities. In this case, the intensity of bumpiness may largely depend on horizontal turbulent flows. Therefore, it is necessary that the meteorological service takes into account not only the vertical gradients of the wind-velocity vector but also the characteristics determining the intensity of horizontal turbulent flows. When the plane increases its speed, it is able to leave the zone of bumpiness without deviating from its course and flying height. It is noted that this is not always in accord with the briefing imparted to flight crews. It is further noted that the use of data concerning the overload of planes in the zone of bumpiness have only a relative value, since these data consider only the overload caused by vertical components. Professor M. I. Yudin is thanked for advice, and O. F. Lobov and L. Ya. Bulakhtina for solving the problem on the computer "Ural". There are 2 figures and 5 Soviet references.

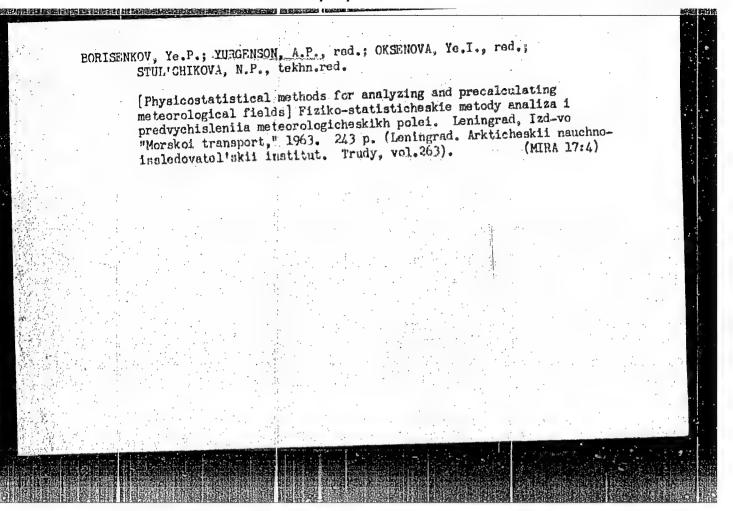
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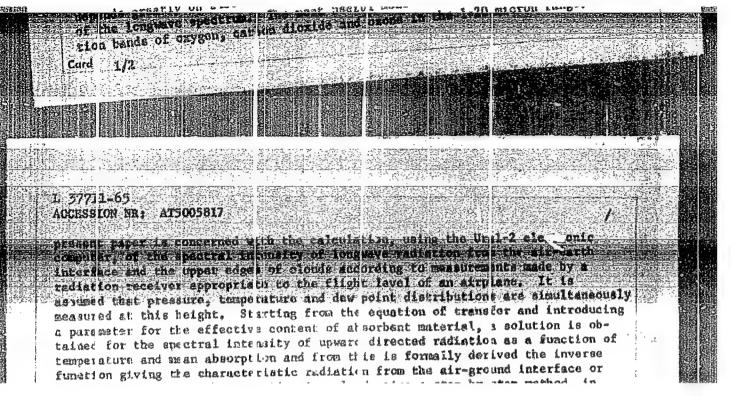






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Po-4/Pe-5/Po-4/Pae-2/P1-4 PSF(N;)/PSS-2/F PT(1/PS(Y)-3/P/G(Y)-5/3116/64,271/000/0019/0030 ACCESSION NR; AT5005817 40 TITLE: Contribution to the study of the spectral origin of ascending longwave AUTHOR! Yurgenson, A. P. SOURCH: Leningrad. Arktiche skip i Antarkticheskiy nauchno-iseledovatel skiy radiation in the atmosphere avanys: Leningeau, Generale and Languerings patody itsledovaniya gidrometeorologi-institut. Trudy, v. 271, 1904. Chislennyye patody itsledovaniya gidrometeorologi-cheekikh unloviy v Arktike i ispol sovaniyet elektromykh tsifrovykh vychislitel! nyth mashin; shornik statesy (Numerical methods of investigating hydrometeorologian) cal conditions in the Arctic using electronic digitar computers; collection of TOPI: TAGE: atmospheric ridiation, longuere radiation, ancending radiation, articles), no, 1, 19-30 numerical forecasting, satillite temperature data, meteornical satellite, ADSTRACE: Evaluation of temperature data received from sutificial satellites radiation absorption depinds greatly on subsidiary absorption experiments in relation to various parts of the loughtee sheeting. The most assert madantements die those for the spoots of owygan, called dioxide and oxone in the 1-20 micron range. The



tampe at the and a manager that are the first the alreground interface or function giving the characteristic rediction from the alreground interface or the try of a cloud. This equation is solved using a stop-by-stap method, in the try of a cloud. This equation is solved using a stop-by-stap method, in the try of a cloud. This equation is solved using a stop-by-stap method, in the try of a cloud. In the try of a cloud. This equation is successive atmospheric layers. A preferred sequence for carrying out the calculations is then given. Orig, art. has: 3 table; and 43 formulas.

Agsold Ation: Arkicheskiy i interktichesk y nauchno-includes stellskiy institut, Leningrad (Arctic and Antarctic Salentific Unsearch Institute)

ENCL: 00 BIS COPE: ES, DP

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ACC NR. AP6034770

SOURCE CODE: UR/0362/66/002/010/1040/1045

AUTHOR: Yurgenson, A. P.

ORG: Leningrad Hydrometeorological Institute (Leningradskiy gldrometeorologicheskiy institut)

TITLE: Influence of radiant influx of heat into the free atmosphere on the evolution of macrocirculational processes

SOURCE: AN SSSR. Izvestiya. Fizika atmosfery i okeana, v. 2, no. 10, 1966, 1040-1045

TOPIC TAGS: heat radiation, atmospheric circulation, atmospheric thermodyanics, atmospheric stratification, synoptic meteorology, long range weather forecasting

ABSTRACT: The author reports the results of a simultaneous analysis of preliminary maps of radiant influx of heat to a layer of air contained between the isobaric surfaces 800 and 600 mb, and maps of the fields of the geopotential at the level p = 500 mb, obtained for the same time, and characterizing the average macrocirculation of field in the free atmosphere. The heat influx was calculated in accordance with the scheme proposed by the author using data of radio sounding of the atmosphere in January - July 1957 (03 - 15 hours) at 23 points located over the territory of the Soviet Union and Western Europe. The circulation indices used in the work were those proposed by A. A. Kats (Sezonnye izmeneniya obshchey tsirkulatsii atmosfery i dolgo-srochnyye prognozy [Seasonal Variations of the General Circulation of the Atmosphere and Long-term Forecasts], Gidrometeoizdat, 1960) for a meteorological series of

Card 1/2

UDC: 551.521: 551.513

#### ACC NR: AP6034770

elementary synoptic processes (ESP). All the values of the pressure, temperature, dew point and cloudiness were everaged for each ESP. All the necessary calculations were made with the high-speed electronic computer of the Leningrad State University by graduate student I. V. Mikhaylova. A fourteen-layer model of the atmosphere was used for the solution of the problem, the top of the atmosphere being considered to be the level c = 45 km. Various data on the atmosphere and its circulation were taken from numerous published sources. The results yielded a number of fields of radiant heat influx to the layer between 800 and 600 mb, each of which corresponding to a definite natural synoptic period with a characteristic type of circulation. The frequency with which the centers of fields of opposite signs coincided in different types of general circulation of the atmosphere were investigated. Various numerical data are cited in favor of the assumption that the two fields actually ineract, although the initial material, in spite of the large number of calculations, is still too scanty for a more conclusive analysis. Orig. art. has: 1 figure and 10 formulas.

SUB CODE: 04, 20/ SUBM DATE: 08Apr66/ ORIG REF: 006/ OTH REF: 004

Cord 2/2

ACC NR: AT6036182

SOURCE CODE: UR/3116/66/277/000/0011/0019

AUTHOR: Yurgenson, A. P.

ORG: None

TITLE: Spectral absorption of longwave radiation in the atmosphere

SOURCE: Leningrad. Arkticheskiy i antarkticheskiy nauchno-issledovatel'skiy institut. Trudy, V. 277, 1966. Chisiennyye metody issledovaniya gidrometeorologicheskikh usloviy v Arktike s ispol'zovariyem elektronnykh tsifrovykh vychisletel'nykh mashin (Numerical methods of studying hydrometeorological conditions in the Arctic with the use of electronic digital computers), 11-19

TOPIC TAGS: spectral absorptivity, spectral distribution, artificial earth satellite, meteorologic satellite, meteorology, electromagnetic radiation, upper atmospheric radiation, electronic computer

ABSTRACT: The research done by Howard, Burch, and Williams [J. Howard, D. Burch and D. Williams. "Infrared Transmission of Sinthotic Atmospheres," J. of the Optical Soc. of America, 1956, Vol. 46, No. 4] is cited as leading up to other work concerned with the derivation of formulas for computing average absorption functions for selected wave lengths. The very real, current, problem facing the world's weather service is how best to use weather satellites, and it is pointed out that installing suitable equipment in such satellites and using them for long periods of time would make it

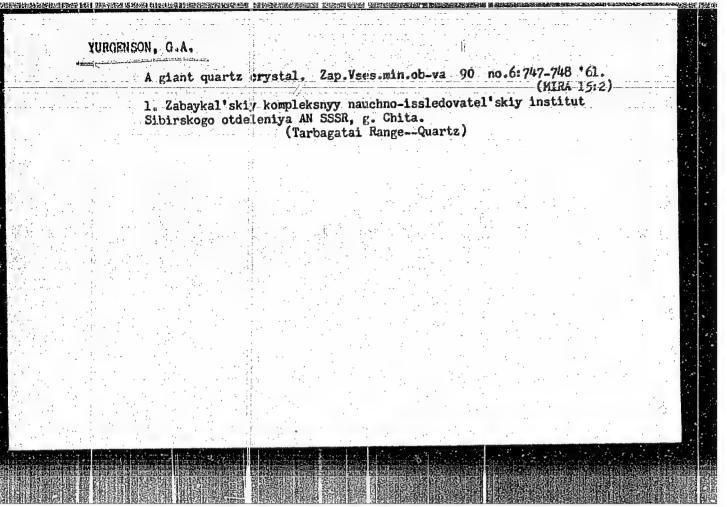
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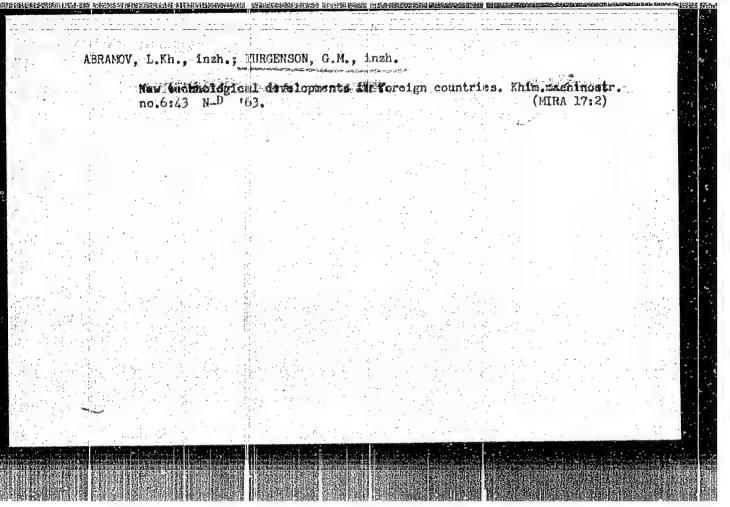
#### ACC NR: AT6036182

possible to amass a wealth of information concerning the physical condition of the atmosphere, the status of the underlying surface of the earth, or the upper limits of clouds. These data could to used for a variety of purposes. A preliminary stage is the amassing of material with respect to the investigation of transmission or absorption of departing longwave radiation in the layer between the earth and the upper limit of the troposphere, using a great many experimental observations and radiation measurements made over various geographic regions, and under different mateorological conditions. The use of a suitable equipped aircraft, or a group of aircraft, with a service ceiling of 12 to 15 km, is desirable. Results could be used to evaluate the accuracy of the instruments used to establish the radiation, as well as to disclose individual shortcomings in those instruments. Processing the results of what must necessarily be great quantities of various types of data would involve the use of high-speed electronic computers. Research has already shown that there are three basic groups of overlapping absorption belts in the real atmosphere in the longwave band of the spectrum. These have been examined and the results are prosented in tabular form. Orig. art. has: 8 formulas and 6 tables.

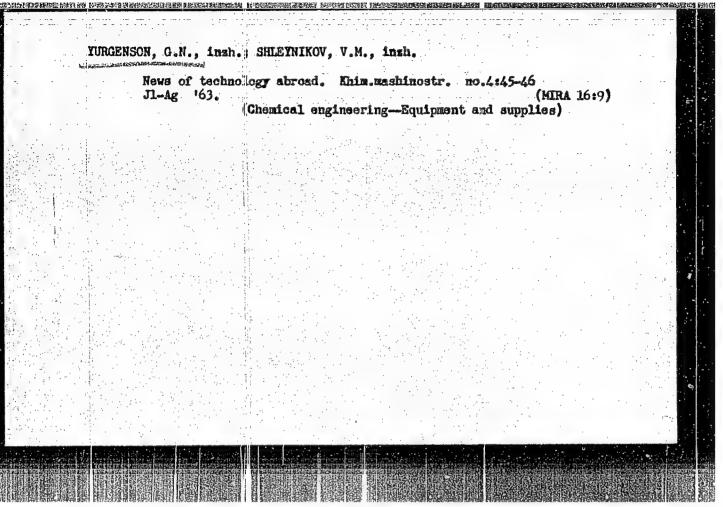
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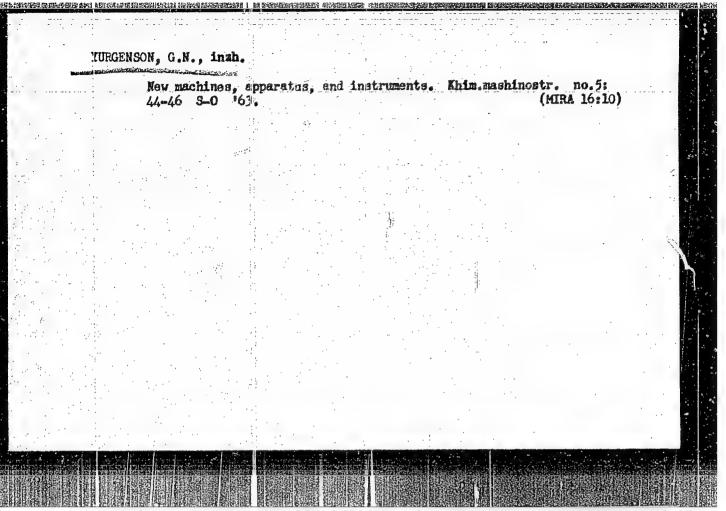
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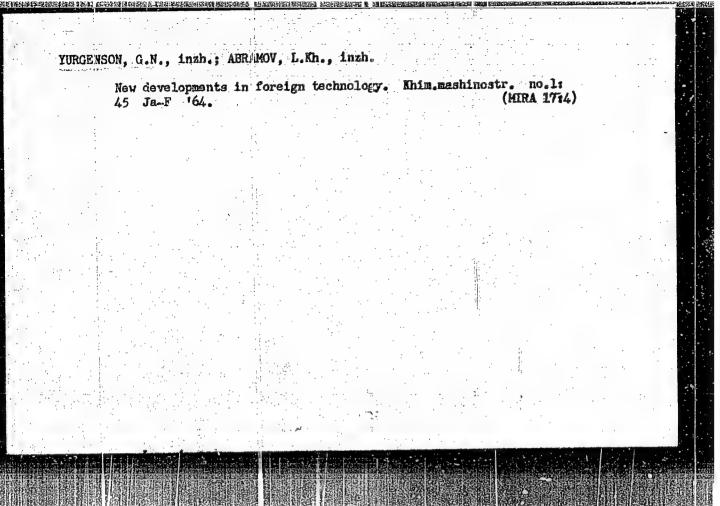




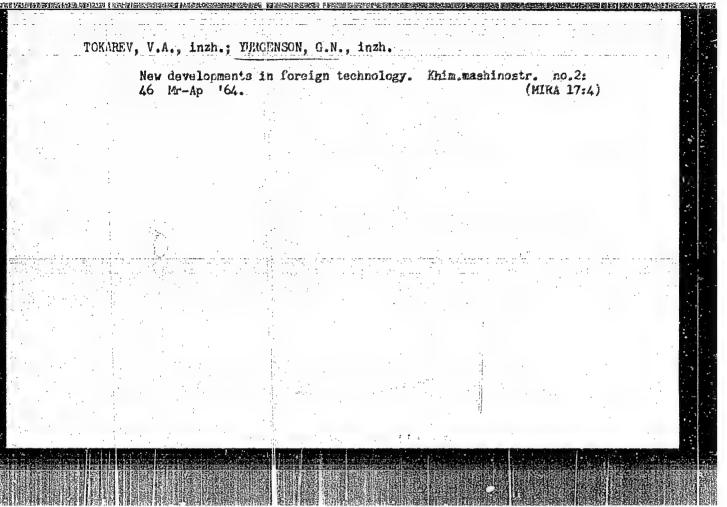
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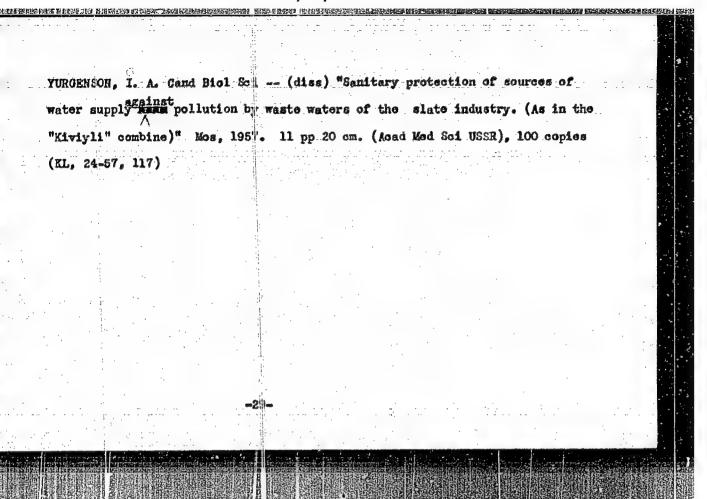




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H-5

genson,

USSR /Chemical Technology. Chemical Products

and Their Application

Water treatment. Sewage water.

Referat Zhur - Khimiya, No 1, 1958, 1799 Abs Jour:

Author Yurgenson I.A.

Title Sanitary Characterization of Sewage Water of the

Shale-Chemical Combine "Kiviyli".

Orig Pub: Gigiena i sanitariya, 1957, No 2, 63-64

Total amount of sewage water resulting from ther-Abstract:

mal processing of shale in tunnel furnaces, is of 8710 m<sup>3</sup>/day, of which 31% are nominally pure. The sewage water contains (in g per liter): coarsely dispersed admixtures 1.1-3.7; NH<sub>3</sub> 0.87-1.77; volatile phenols 0.13-1.35; non-volatile phenols 0.10-4.2; ketones 0.13-6.97; H<sub>2</sub>SO<sub>2</sub> 0-0.8 mg/liter.

Titer of bacteria coli is above 333 for all sewage

Card 1/2

USSR /Chemical Technology. Chemical Products and Their Application Water treatment. Sewage water.

H-5

Abs Jour: Referat Zhur - Khimiya, No 1, 1958, 1799

water. The sewage water causes extreme pollution of the rivers Erra and Purtse and of the water of the Gulf of Finland.

Card 2/2

5(3), 17(12) AUTHORS: Terent'yev, A. P., Kost, A. N., Zolotarev, S07/153-58-4-9/22 Ye.Kh, Vinogradova, Ye. V., Kalakutakaya, T. V., Yurgenson, I. A. I. The Esters of Tetrahydro-Phthalic Acid and Its Homologs as Insect Repellants (I. Efiry totragidroftalevoy kisloty i yeye gomologov kak insektorepellenty) PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Khimiya i khimicheskaya tekhnologiya, 1958, Nr 4, pp 55 - 60 (USSR) Although the insect repellents have been more and more ABSTRACT: applied so far and thousands of individual preparations have been tested, neither the relation between their structure and efficiency nor their mechanism of efficiency have been definitely clarified. For these reasons the search for new means was often unsuccessful, whereas hardly a few of the thousands of tested substances were practically used. Dimethyl phthalate is the most carefully investigated and practically most applied repellent. Yet it is not efficient in any case, and large-scale use of it is limited by raw material

I.The Esters of Tetrahydro-Phthalic Acid and Its Homologs as Insect Repellents SOV/153-58-4-9/22

scarcity. The authors synthetized other prospective repellents: "Indalon", "Rudzhers-612" (in the USSR RP -52) and "Dimelon" (RP-50), which had the same offer as or a weaker effect than dimethyl phthalate on various mosquito species. RP. -50 was a little more active than others. Therefore the authors investigated, according to the hydro phthalic acid (RP -1, RP -2, RP -5, RP -17, RP -20, RP -23, RP 33 and RP 51). Dimethyl, diethyl and dibutyl phthalate were used for comparison. The compounds investigated are related in structure to dimethyl phthalate, but differ by their lack of aromatic bonds in the 6-membered ring. Diene hydrocarbons and maleic anhydride, which are easily obtained by benzene or furfural-oxidation, were the raw materials used for that purpose. In summer of 1954. Ye.Kh.Zolotarev and N.A. Tamarina investigated at the Belomorskaya biologicheskaya stantsiya MGU (White Sea Biological Station of the university mentioned in the title) the effect of individual preparations on mosquitoes Aedes communis and Ae.dorsalis and cerato-

Card 2/4

I. The Esters of Tetrahydro Phthalic Acid and Its SOV/153-58-4-9/22 Homologs as Insect Repellents

pogonides of the species Culicoides. At the Ryazanskiy meditsinskiy institut ineni I.P.Pavlova (Ryazan Medical Institute imeni I.P.Pavlov) it was found that a narcotic effect (fusel-oil drunkenness) is exercised by the dibutyl esters upon rats and rabbits. Largescale tests in 1996 showed that the preparations RP .1 and RP -50 protect efficiently against the mesquitoes: Acdes vexans, A.msculatus, A.excrucians, A.Cyprius, A. cataphylla, A.punctor, A.communio, A.cinereus, A. dorsalis, and Anopheles bifurcatus. A table shows the comparative efficiency of individual repellents. It results from this that the repellents RP-1, RP-17 and RP-51, which were investigated for the first time, are equal to dimethyl phthalate with respect to their efficiency. The efficiency degree of various mixtures of these compounds was not higher. Further investigations would be necessary only of RP-44 (dimethyl phthalate with diethyl adipate), EP - (the same with dibutyl sebacinate) and RP-47 (the same with anisole), since they are a little longer efficient against mosquitoes. All preparations

I. The Esters of Tetrahydro Phthelic Acid and Its 50V/153-58-4-9/22 Homologs as Insect Repellents

were investigated as to their acidity, which causes skin irritation, as is known. It was found that the introduction of a methyl or methylene group into the structure of the dimethyltetrahydro phthalate does not exert considerable influence upon the activity of the preparation. Admixtures were supplied by P.A.Moshkin, Couresponding Member, Academy of Sciences, USSR, and V.I.Lyubdmilov, Candidate of Chemical Sciences. There are 1 table and 18 references, 5 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova (Moscow State University imeni M.V.Lomonosov) Kafedra organicheskoy khimii i kafedra entomologii (Chair of Organic Chemistry and Chair of Entomology)

SUBMITTED: Card 4/4

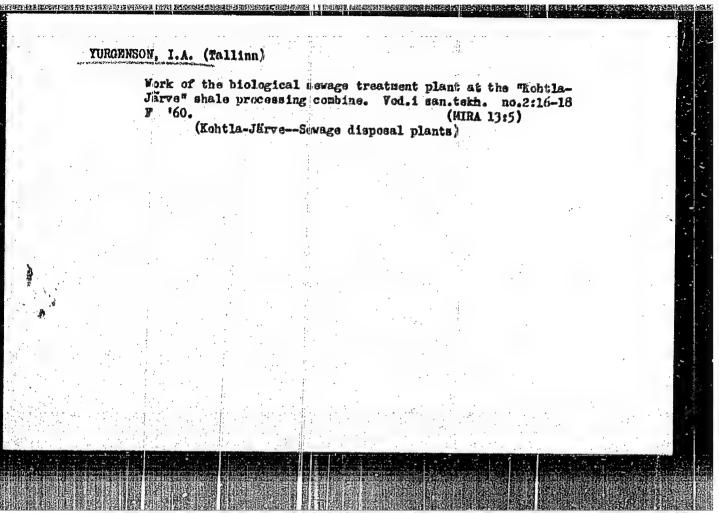
November 2, 1957

ZOLOTAREY, Te.Kh.; FEDDER; M.L.; YUDIN, L.G.; YURGENSON, I.A.

Study of repellents. Report No.3: Acyltetrahydroquimolines as protective substances against flems. Vest.Nosk.un.Ser.biol., pochy., geol., geog. 13 no.3:43-52 '58. (MIRA 12:1)

1. Kafedry organicheskoy khimii entomologii Moskovskogo gos. universiteta i TSentral'nyy dezinfektsionnyy nauchno-issledovatel'skiy institut.

(Quinoline) (Fleas) (Insect baits and repellents)



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AKKERBENO, I.I., kand, med.nauk; BLINOVA, E.A.; VIRCHENKO, A.N.; TURCHENON,

LAA. [Jungmon, I.], kand, biologicheskikh nauk; YANES, Kh.Ya.

[Jahes, H.]

Hygienic determination of air pollution in a shale industry region.

Gig.1 san. 25 no.8:5-7 Ag '60. (MIRA 13:11)

1. Iz Insjitute eksperimental noy i klinicheskoy meditsiny Akademii nauk Estorskoy SSR.

(AIR-POLLUTION) (SULFUR DIOZIDE)

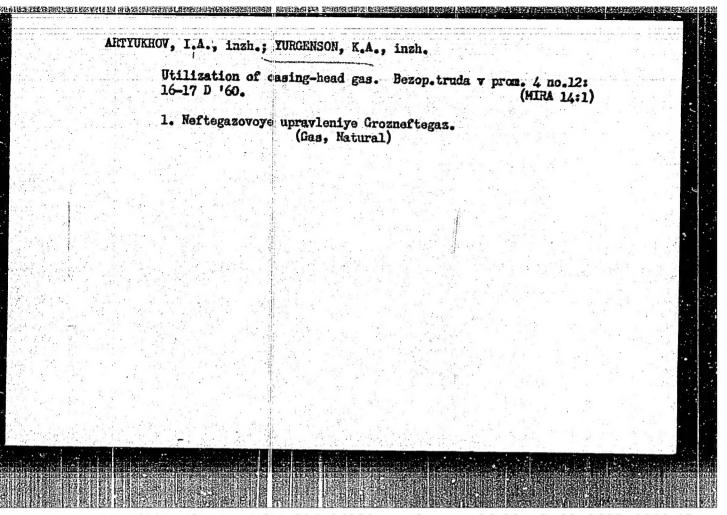
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YURGENSON, I.A.; TEPLYKH, V.S.

Bairamlia fuscipes Waterston (Hymenoptera, Pteromalidae), a parasite of fleas. Zool. s ur. 39 no.12;1879-1880 \*\*60. (MIRA 14:1)

1. Department of Mutomology, Moscow State University. (Chalcid fliss) (Parasites—Fleas)

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YURGENSON, L. USSR (600)	mtilation		
Farm Buildings-Heating and V			
Ventilation system in the care. Sel'. stroi. 7 no. 6	tile barn on the "Yoskhodiashchai 1952	a zvezda <sup>a</sup> Collective	
Monthly List of Russian Acce	8 lions, Library of Congress, March	n 1953. Unclessified.	

Accelerated methods of determining gelatiname. Lab. delo 8 no.10:37-39 \*62 (MIRA 17:4)

1. Eafedra mikrobiologii, infektsionnykh bolezney i dermatologii Tartuskogo gosudarstvennogo universiteta.

Aaucn.1 re	tches for on-the-road repair ez. 21 no.12143-45 D '62.	(MIRA 16:1)	
1. Wauchno	-issledovatel'skiy institut (Tires, Rubber-Rep	shinnoy promyshlennosti.	
255 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -			